FAMILY LYCEUM.

PUBLISHED WEEKLY, AT THE LYCEUM PRESS, No. 3, CORNHILL, BY GEORGE W. LIGHT & Co.

VOL. I. BOSTON, SATURDAY, FEBRUARY 23, 1833. No. 28.

FAMILY LYCEUM.

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TERMS: Two dollars a year, in advance. Six copies for ten dollars.

BIOGRAPHY.

COLUMBUS.

[Concluded from the last Lyceum:]

COLUMBUS was the first European who set foot in the New World which he had discovered. He landed in a rich dress, and with a naked sword in his hand. His men followed; and, kneeling down, they all kissed the ground which they had so long desired to see. They next erected a crucifix, and prostrated themselves before it, returning thanks to God for conducting their voyage to such an happy issue. This island was one of the Bahama islands, to which he gave the name of San Salvador, and took possession of it in the name of their Catholic majesties. In this first voyage he discovered several other of the Lucayo or Bahama islands, with those of Cuba and Hispaniola. The natives considering the Spaniards as divinities, and the discharge of the artillery as their thunder —they fell prostrate at the sound. The women, however, offered their favors, and courted the embraces of the new guests, as men. Their husbands were not jealous of them; and in the arms of those wantons the companions of Columbus are said to have caught that malady which directs its poison to the springs of life. He afterwards touched at several of the islands in the same cluster, inquiring everywhere for gold, which he thought was the only object of commerce worth his attention. In steering southward, he discovered the islands of Cuba and Hispaniola, abounding in all the necessaries of life, and inhabited by a humane and hospitable people. On his return, he was overtaken by a storm, which had nearly proved fatal to his ships and their crews. At a crisis when all was given up for lost, Columbus had presence of mind enough to retire into his cabin, and to write upon parchment a short account of his voyage. This he wrapped in an oiled cloth, which he enclosed in a cake of wax, put it into a tight cask, and threw it into the sea, in hopes that some fortunate accident might preserve a deposit of so much importance to the world. After obtaining his grand object, the discovery of the New World, he returned to Spain, and arrived at the port of Palos, on the 14th of March, 1493. As soon as the ship was discovered approaching, all the inhabitants of Palos ran eagerly to the shore, where they received the admiral with royal honors. The court was then at Barcelona, and Columbus immediately acquainted the king and queen of his arrival. They were no less delighted than astonished with the unexpected event. They gave orders for conducting him into the city with all imaginable pomp. They received him clad in their royal robes, and seated on a throne under a magnificent canopy. When he approached, they stood up; and raising him as he kneeled to kiss their hands, commanded him to take his seat on a chair prepared for him, and to give a circumstantial account of his voyage. When he had finished his oration, which he delivered with much modesty and simplicity, the king and queen kneeling down, offered up solemn thanks to God for the discovery. Every possible mark of honor that could be suggested by gratitude or admiration, was conferred on Columbus; the former capitulation was confirmed; his family was ennobled, and a fleet was ordered to be equipped, to enable him to go in quest of those more opulent countries which he still confidently expected to find. This consisted of seventeen ships, having on board 1500 persons, several of them men of rank, destined to settle in these newly discovered countries, and amply furnished with all necessaries for that purpose.

Columbus sailed from Cadiz upon his second voyage, on September 25, 1493. After a series of adventures he at length arrived at Hispaniola, where he found the little garrison he had left totally extirpated,—a catastrophe brought on them by their own ill conduct towards the natives. Columbus rejected the solicitations made by some of his followers to revenge their deaths, and proceeded to establish a colony, by building a town, to which he gave the name of Isabella, in honor of his royal patroness. Having by his prudence and vigor tolerably composed some discontents and mutinies, which had arisen among his colonists, he left his brother Diego to govern the settlements, and proceeded with a small squadron on an exploratory voyage. In this expedition he made no other discovery of importance than that of the island of Jamaica. On returning to Hispaniola, he found there his brother Bartholomew, who had been sent from Spain with a reinforcement of three ships loaded with provisions. An Indian war then succeeded, which in the end proved extremely destructive to a people naturally timid, and prodigiously inferior in every respect to their invaders. Numerous complaints against the conduct of Columbus had been transmitted to the court of Spain by the malcontents, and a commissioner had been sent over to inquire into their validity. The manifest partiality of this officer induced Columbus to resolve to lay before the throne in person a full account of his transactions. He arrived in Spain, in 1496. The presence of a great man often produces effects in his favor which he would in vain expect from distant representations. The tranquil self-confidence which Columbus eminently possessed, put his enemies to silence, and with the assistance of the gold and precious commodities which he brought with him, recovered the good opinion of his sovereigns. In May, 1498, Columbus proceeded on his third voyage across the Atlantic, with a squadron of six ships. He arrived at Hispaniola in August, much debilitated by sickness and fatigue.—There he found that his brother, according to his advice, had removed the colony from Isabella to St. Domingo, on the opposite side of the island. He also found that a mutiny had been raised by the chief justice Roldan, who had seceded with a number of settlers, and threatened a civil war. This he composed as well as he was able, and gratified the discontented with allotments of lands, to which were annexed those distributions of the poor natives, called repartimientos, which eventually proved such an intolerable source of cruelty and oppression to those wretched beings. Envy and malignity, however, still pursued him. The complaints against him and his brothers, transmitted to court, were more loud and importunate than ever. At length queen Isabella was to such a degree influenced by the charges brought against Columbus, that she signed an instrument revoking his appointment as viceroy and governor of the countries he had discovered, and nominating Francis de Bovadilla in his stead. This man, in the insolence of power, without even admitting Columbus to his presence, threw him into chains, and sent him, along with his brothers also fettered, to Europe. On his arrival in Spain, they were shocked with the idea of that imputation of ingratitude which the Spanish court must undergo from all mankind, upon such unworthy treatment of so great a benefactor to the nation. He was immediately liberated, presented with a sum of money, and invited to court, where he was received with kindness and civility by the king and queen.—Bovadilla was disgraced, yet Columbus was not restored to his former dignity. And so deeply did the injury which he had sustained sink into his mind, that he always carried about with him the fetters which he had worn, hung them up in his chamber, and ordered that they should be buried with him. His passion for discovery, however, led him to propose another voyage, the leading purpose of which was his original idea of opening a new tract to the East Indies.

On this fourth voyage, accompanied by his brother Bartholomew, and his son Ferdinand, and furnished with only four small barks, he sailed from Cadiz in May, 1502. On arriving off St. Domingo, he found eighteen loaded ships preparing to depart for Europe.—As from certain tokens he discerned the approach of a hurricane, he requested permission to enter the harbor, and at the same time warned the fleet not to sail. Both his request and his warning were disregarded.—The hurricane came on. By proper precautions he escaped its fury; but it fell with such violence on the fleet, that only two ships were saved, and Bovadilla and Roldan, and several of his inveterate enemies, perished with all their wealth. It happened too, that among those vessels which escaped, was that on which the wrecks of Columbus's property were embarked. Columbus proceeded on his journey, and traced all the coast about the isthmus of Darien, in search of his imagined strait. He left a small colony under the command of his brother on the river Belem, and then sailing homewards was wrecked on the island of Jamaica. At length he was delivered by a squadron sent from Hispaniola; and after a short stay at St. Domingo, he embarked for Spain, and reached St. Lucan in December, 1504, and thus finished his last disastrous voyage.

He had the mortification of finding his best friend, Isabella, dead; and Columbus could never obtain the fulfilment of any part of that treaty to which he was entitled. Disgusted with the ingratitude of a monarch, whom he had served with so much fidelity and success, and exhausted with fatigue, he ended his active and useful life at Valladolid, on the 20th of May, 1506, in the fifty-ninth year of his age. He died with a composure of mind suited to the magnanimity which distinguished his character, and with sentiments of piety becoming the sincere respect for religion, which he manifested in every occurrence of his life. He was grave, though courteous in his deportment, circumspect in his words and actions, irreproachable in his morals, and exemplary in his religious duties. The following anecdote, which is related of him, will give some idea of his sagacity and prudence. While his vessels lay off Hispaniola, the Indians neglected to bring the provisions he had agreed for; on which he sent for the chiefs, and informed them that the God of the Christians was angry at their breach of faith, and as a proof of it, the following night the moon would rise with a threatening and bloody aspect. He knew that there would be an eclipse that night, but the Indians made light of the prediction till they saw it verified; on which, in great terror, they supplicated his forgiveness, and ever after brought the stipulated supplies regularly. The king was so just to his memory, notwithstanding his ingratitude during his life, that he buried him magnificently in the cathedral of Seville, and erected a tomb over him with this inscription:

A Castilla y a Leon
Nuevo mundo dio Colon.

Columbus has given a new world to the kingdoms of Castile & Leon.

The king also confirmed to his sons their hereditary rights. Don Diego, the eldest son, was put in possession of all his father's posts in 1508; and his brothers lived honored and distinguished as became sharers in the blood of the great Columbus. That another person should supplant him in the glory of giving a name to that New World which he discovered, appears a singular caprice of fortune, or rather of human injustice; and may be regarded as completing that train of calamities and indignities, which rendered him much less a happy than a famous man. —[*Universal Biography.*

For the Family Lyceum.

THE AUTOMATON CHESS PLAYER A LIVING AGENT.

THE Automaton Chess Player, which for a long time was the delight and admiration of all Europe, was constructed in 1769, by Baron Kempelen, of Presburg, in Hungary. After its completion, it was exhibited in Vienna and Paris, and in 1783 in London and different parts of England, without the secret of its movements being discovered.—Those who witnessed the exhibition of the Automaton in this city, a few years since, by Mr. Maelzel, cannot, I think, have forgotten the pleasure derived from the mysterious operations of this wonderful piece of mechanism.

When the Automaton was first exhibited in Europe, it was supposed that it was actuated by the exhibiter, either by mechanical means conveyed through the feet of the player, or by a magnet concealed in the body of the exhibiter. The first of these hypotheses was excluded by the fact that no such communication between the exhibiter and the machine was visible, and that it was not necessary for the machine to remain stationary. Hence the opinion prevailed, that its operations were performed by a magnetic agent; but as the exhibiter allowed a loadstone, during the progress of the game, to be placed on the machine, which would have deranged all its operations, had the moving power been a magnet, this supposition was also abandoned.

As the inventor had himself admitted that there was an illusion connected with the performance of the Automaton, many persons conjectured that the game was played by some one concealed in the interior. Before we proceed to show that this is the case, it will be necessary concisely to describe the machine.

'The Chess Player is a figure as large as life, clothed in a Turkish dress, sitting behind a large square chest or box three feet and a half long, two feet deep, and two feet and a half high. The machine is on castors, and is wheeled about the room previous to the exhibition. The Turkish Chess Player sits on a chair fixed to the square chest; his right arm rests on the table, and in the left hand he holds a pipe, which is removed during the game, as it is with this hand that he makes the moves. A chessboard eighteen inches square, and bearing the usual number of pieces, is placed before the figure.'

The Automaton, as above described, is exhibited to the spectators, they not being permitted to approach it within several feet, for inspection. The first step taken by the exhibiter is, to unlock a door in front of the chest, at the right hand of the player, which exposes to view a small cupboard, lined with dark colored cloth, containing wheels, cylinders, levers, and various pieces of machinery, occupying apparently the whole space. He next opens a door directly back of the one first shown, and displays by the light of a lamp the enclosed machinery. When the light is withdrawn, the door is locked, and the exhibiter, having shown the spectators the interior of one end of the chest, next proceeds to open a drawer in front, at the bottom of the box, out of which is taken a set of chessmen, and a cushion for the support of the Automaton's arm, leaving the impression that this is the sole object of the drawer. The next operation is, to expose, by opening the two front doors of the large cupboard, the whole unexamined part of the front. This, like the cupboard first shown, is lined with dark cloth, and contains various pieces of machinery. After this, the chest is wheeled round, the coat of the Turk lifted up, and two small doors opened—one into the trunk and the other the thigh. The machine having been thus exhibited, is wheeled back into its original position; the doors and drawer in front are closed and locked. The exhibiter, after being occupied a short time at the back of the chest, apparently adjusting the mechanism, removes the pipe from the hand of the figure, and winds up the machine.

As soon as an opponent is found among the spectators, the Automaton commences the game, and takes the first move. He moves his head, rolls his eyes, and seems to see every part of the chess board. At every move, the wheels of the machine are heard in motion. When a false move is made, the Automaton shakes his head, replaces his opposer's piece, and takes the next move himself. In general, though not always, the Automaton wins the game.

While the game is playing, the exhibiter walks round the machine, and after ten or twelve moves, winds it up. At one corner of the room is a small square box, to which he now and then goes, apparently for the purpose of consulting it.

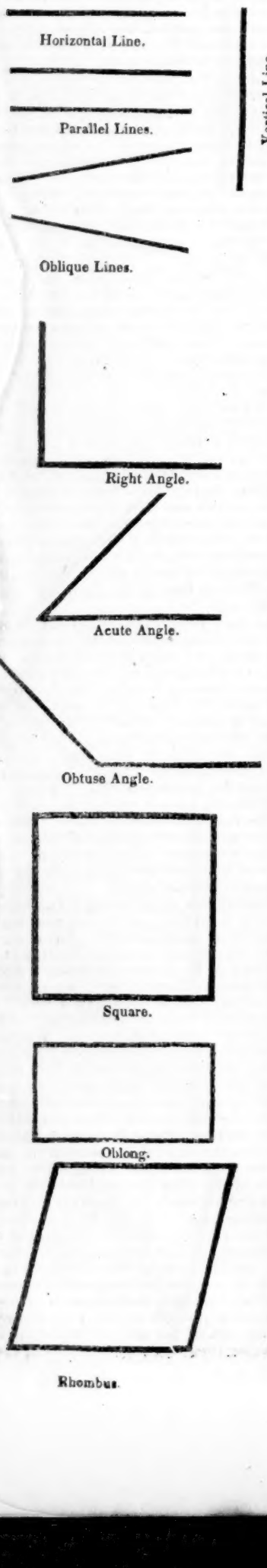
Now all this manœuvering is for the purpose of deception; as no one can doubt, who has a mechanical eye. Any one curious enough to investigate the subject, is referred to Dr. Brewster's letters, recently published, on 'Natural Magic,' where he will see it clearly demonstrated, by a variety of figures, that a person is concealed within the machine, and plays the game. It is there shown, that behind the drawer in front there is a space, never exposed to the view of the spectators, fourteen inches broad, eight inches high, and three feet eleven inches long. This is occupied by the chess player in his first position. He is introduced into the machine through a sliding panel at the right of the Automaton; and sitting on the floor, back of the front drawer, bends his head down to his knees, and drops behind him, at the same time, a screen. Here he remains till the two cupboards at the right of the Automaton, before and behind, are unlocked, exhibited, and the one at the back again locked up—there being a partition between the two cupboards, the front one is left open, for deception. No sooner is the cupboard at the back of the machine locked up, and the spectators convinced that no living agent

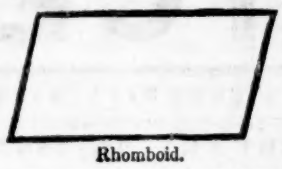
is concealed in the part of the chest which has been exhibited, than the player raises the screen at his back, sits upright, draws it down in front of him, and in this, his second position, remains till that part, just vacated by his body, has been shown. The large cupboard in front having been shown, as well as those in the trunk and legs of the Automaton, the drawer in front of the chest is then drawn out, apparently for the purpose of examining its contents, but in fact to give the player an opportunity of drawing round his legs, and raising himself up into the trunk of the Automaton, where he sits on a box at ease, looking through the waistcoat of the figure, as through a vase, down upon the chess board, and with his left hand in the arm of the figure, by means of wires communicating with the fingers, takes up and puts down chessmen with such skill as might be expected from a professional player.

That this is the true secret of the magical operations of this wonderful piece of machinery, there cannot be, I think, with a long acquaintance with almost every species of mechanism, the shadow of a doubt. D.

FAMILY INSTRUCTION.

GEOMETRICAL FIGURES AND LETTERS.

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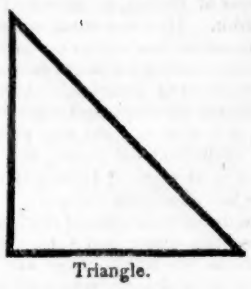
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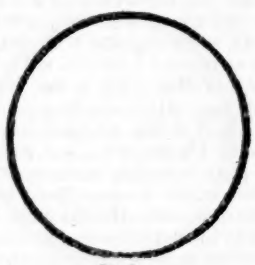
Circle.

COUNTING.

Some of the first formal instruction parents attempt to give children, is, learning them to count; and in almost every attempt, one or two important mistakes are committed. It is common for parents to attempt this kind of instruction too early, or before the mind is prepared for it, and while many other things might be learned with ease, and with great delight to the child.

The great mistake, however, is in causing them to repeat the names of numbers, faster than they attach ideas to them. It is generally supposed, perhaps, that a child has made some progress in numbers when he can repeat their names up to ten; but all the progress he has made is to throw obstacles in his way to real numbering. It is a great trouble to a child to have heard the word five, before he is prepared to associate an idea with it. The trouble of these unmeaning words to children, has, undoubtedly, been witnessed by every parent, by observing that children say, one two, five, eight, &c., showing that these words which they repeat have no meaning to them, and that knowing the words confuses the mind, and prevents their applying the terms in their proper order. If a child had never heard the word five or eight, until he had associated ideas with three and four, it would not present itself to his mind instead of the proper term.

The fact is, undoubtedly, that parents by learning children to repeat the numbers up to ten or more, as early as it is generally done, instead of aiding them in the process of counting, throw embarrassments in their way, which cost them much time and labor to get over.

We have often witnessed in children a fact in illustration of this principle. We have seen many children who would give the correct names to figures, of three, four, five, six, seven and eight sides, who if they were asked how many two fingers and one finger were, would be as likely to say five or eight, as three. Hold up a three-sided figure, and they would call it a triangle; a four sided, a square, rhombus, or rhomboid, according to its shape; a five sided figure, they would call a pentagon; a six sided a hexagon, an eight sided an octagon, &c.; while they could not apply the correct names to numbers higher than two.

The philosophy of this is perfectly plain; whenever they had heard the word pentagon, hexagon or octagon, they had a figure before them which that word represented. But they had heard the words three, four five, six, and eight often mentioned, without the number of objects which the words designated. They learnt the names of the figures as they learnt the names of persons, articles of dress or furniture; to learn to number, they must not only apply names, but they must go through with a process of abstraction, or learn the comparative value of the several numbers.

Whoever will examine the nature of this subject, or its results in practice, will probably be satisfied that parents generally commence learning children to count too soon; and that when they do commence, they commit a mistake which throws obstacles in their way, instead of affording them the aid they design.

Some may ask, perhaps, what children at an early age, say from two to four years, can learn to greater advantage than counting. We answer, things; the names of things; the properties of things; the uses of things. A child can evidently learn that a certain animal is called cat; that the cat can run, bite, scratch, and catch mice, &c., before he can learn that she has *four* legs. He can learn that the dog has teeth, and the use of those teeth, before he can number them. He can learn the name, properties and uses of fire, water, wood, iron, and almost every thing he sees, before he can take the first step in the abstract process of numbering.

The first of all subjects, perhaps, which naturally occupies the attention of children, is the shape or form of objects. The fact that they learn the names of things by their forms, more than any other circumstance is probably a sufficient proof of this position. A child learns the names of chair, table, pitcher, glass, &c. not from their color, their weight, or their hardness, but their shape. A child would not be apt to mistake the name of chair, table, or pitcher, after he had once learned it, because it was black, or white, or of a different color from what he had before seen, while the shape was the same. But alter the shape materially, and he would expect a new name.

The fact is, the early, and even the first progress in children, shows conclusively that the first principles of Geometry are peculiarly fitted for juvenile and even infantile instruction. It would seem so from theory; it is fully proved to be so from fact. No subject more delights children than learning and *forming* the geometrical figures. Nothing has probably ever been discovered which will amuse children so long, as a set of simple geometrical blocks. In the thousands of experiments which have been tried with that part of the '*Family Apparatus*,' it is believed no one has failed. It is believed that in millions of others, no one will fail.

TEACHING THE ALPHABET.

We have known many hundreds, and we believe thousands of children, learn the names of from thirty to forty different objects in an hour; and yet millions of children have been occupied in learning twenty six objects for six months or a year, and even eighteen months. And children when left to adopt their own mode of learning, as was observed in the last Lyceum, will learn to speak two languages, while under the *school process* they learn the alphabet of one language. Wherever an English family has a French nurse, every child from two to three years of age will learn to speak the English and French language without confounding one with the other. When we compare with this, the fact that two or three thousand children in the Boston Primary schools, from four to five years old, are occupied from six to eighteen months, in learning the alphabet of a language, they can already speak, we cannot doubt that a radical defect prevails in the mode of teaching in these schools.

The thirty or forty objects already referred to as being learnt by hundreds of children in an hour, are the geometrical figures, some of which are here represented. And we see not why, if the same method was applied to teaching the alphabet, they would not learn those characters in the same time, except that they are not quite as simple.

The child is greatly aided in learning the names of the geometrical figures, by analyzing them, by examining the number of sides, &c. He receives nearly the same aid by analysing the letters—by telling whether a letter is composed of straight or crooked lines, of vertical or horizontal, parallel or oblique; of acute, right or obtuse angles.

The letters of the alphabet and the geometrical figures, connected with this article, will aid our readers in understanding our meaning. They will see that it is as easy for a child to tell whether the letter H is composed of straight or curved lines, as to tell the same of a triangle, square or circle. When he knows what the word parallel means, he can tell whether the lines composing the letter H are parallel or oblique, as well as he can answer the same questions respecting a square or any geometrical figure.

Let the parent try the experiment, by asking some of the following questions respecting the figures and letters here given.

Are parallel lines at the same distance apart in every place, or at different distances? Are oblique lines equally distant at both ends, or are they farther apart at one end than the other? Which is sharpest, an acute or obtuse angle? Is an obtuse angle larger or smaller than a right angle? How many lines in L? and are they horizontal, vertical, or both? Do the lines form a right, acute or obtuse angle? How many lines and angles in H? Are the opposite lines parallel or oblique? are the angles right or obtuse? How many lines in D? and are they straight or curved, or both? How many sides and angles has a square? also a rhombus? Are the sides equal or unequal? In a rhombus are all the angles equal or only the opposite angles? Are the angles of a square equal, or unequal? Are the lines in X vertical, horizontal or oblique? how many angles in X? and are they equal or unequal? The same course of questioning may be pursued with all the letters, both for the instruction and amusement of children. It amuses them because it brings their minds into an agreeable exercise.

CHILDREN'S BRICKS.

A part of the Family Apparatus is a set of blocks of the same shape as bricks; that is, they are twice as long as they are wide, and twice as wide as they are thick. This shape enables children to pile them in an infinite variety of forms, and affords them an endless novelty. The consequence is that they never tire, but afford new and increased interest from week to week, and month to month. The consequence is that they survive thousands of other toys, which are provided and replaced by parents, and received and rejected by children: and which are expensive to the one and unsatisfying to the other.

The great excellence, however, of these simple intellectual toys, is, that they are intellectual. The novelty which so much and so long delights the child is a constant series of discoveries made by the mind; the excitement they afford is from an active and most salutary exercise of the mind. It is an easy, natural, but most healthful exercise of the judgment.

In addition to the instruction and amusement afforded from piling these bricks, there are connected with them some natural and successful lessons in letters. Each block has upon it the picture of some object familiar to children, with the name beneath, all the names embracing the whole alphabet. By this means children never fail to learn the whole alphabet, not by spending a year in the dignified and rational process of 'saying A and B, and sitting on a bench,' but in the natural and delightful sports of a child. By other lessons in words, and letters placed upon cards, &c., children will learn to read almost of themselves with the additional advantage of making every idea they obtain a constituent part of their character. Little more is necessary than to furnish children with the tools of knowledge; their own ingenuity with their love of it will furnish them with modes of using them.

MAGNETISM.

The natural magnet, or loadstone, is a hard mineral body of dark brown, or almost black color, and when examined, is found to be an ore of iron. It is met with in various countries, generally in iron mines, and of all sizes and forms.

It is not precisely known when and by whom the directive property of the magnet was discovered. The most probable accounts seem to prove that it was known early in the 13th century; and that the person who first made mariners' compasses, at least in Europe, was a Neapolitan of the name of Flavio, or John de Gioga, or Giova, or Gira.

The natural loadstone has also the quality of communicating its properties to iron and steel; and when pieces of steel properly prepared are touched, as it is called, by the loadstone, they are denominated artificial magnets.

These artificial magnets are even capable of being made more powerful than the natural ones; and as they can be made of any form, and are more convenient, they are now universally used, so that the loadstone or natural magnet is only kept as a curiosity.

All magnets, whether natural or artificial, are distinguished from other bodies by the following characteristics.

1. A magnet attracts iron.

2. When a magnet is placed so as to be at liberty to move freely in every direction,

its ends point towards the poles of the earth, or very nearly so; and each end always point to the same pole. This is called the polarity of the magnet; the ends of the magnet are called poles; and they are called the north and south poles of the magnet, according as they point to the north or south pole of the earth. When a magnet places itself in this direction, it is said to traverse.

3. When the north pole of one magnet is presented to the south of another magnet, these ends attract each other; but if the south pole of one magnet is presented to the south pole of another, or the north pole of one to the north pole of another, these ends will repel each other.

4. When a magnet is situated so as to be at liberty to move itself with sufficient freedom, its two poles do not lie in a horizontal direction, but it generally inclines one of them towards the horizon, and of course it elevates the other pole above it. This is called the inclination or dipping of the magnet.

5. Any magnets may, by proper methods, be made to impart those properties to iron or steel.

A plane perpendicular to the horizon, and passing through the poles of a magnet when standing in their natural direction, is called the magnetic meridian; and the angle which the magnetic meridian makes with the meridian of the plane where the magnet stands, is called the declination of the magnet at that place.

MAGNETIC ATTRACTION AND REPULSION.

When a piece of iron is brought within a certain distance of one of the poles of a magnet, it is attracted by it; and if the iron is at liberty to move, it adheres to the magnet, and cannot be separated without some force. It appears at first sight, that the attraction lies only in the magnet, but experiment proves this attraction to be mutual, the iron attracting the magnet as much as the magnet attracts the iron. This attraction is strongest at the poles of a magnet, and diminishes in proportion to the distance of any part from the poles, so that in the middle between the poles there is no attraction. The intensity of the attractive power diminishes, also, according to the distance from the magnet.

As magnetic attraction takes place only between poles of different names of different magnets, consequently magnetic repulsion acts only between poles of the same name of different magnets. When a piece of iron is brought within a certain distance of a magnet, it becomes, in fact, itself a magnet, having the polarity, the attractive and repulsive properties for other iron, &c.

Soft iron, when placed within the influence of a magnet, easily acquires these properties; but they last only while the iron remains in that situation, and when it is removed, its magnetism vanishes immediately.

But with iron containing carbon, and particularly with steel, the case is very different; and the harder the iron or steel is, the more permanent is the magnetism which it acquires from the influence of a magnet; but it will be in the same proportion more difficult to render it magnetic. Neither the magnetic attraction nor repulsion is in the least diminished, or at all affected, by the interposition of any sort of bodies, except iron, or such bodies as contain iron.

The properties of the magnet are not affected either by the presence or by the absence of air. Heat weakens the power of a magnet, and subsequent cooling restores it, but not quite to its former degree. A white heat destroys it entirely, or very nearly so; and hence it appears, that the powers of magnets must be varying continually.

The attractive power of a magnet may be considerably improved by suspending a weight of iron to it by its power of attraction, which may be gradually increased; and also by keeping it in a proper situation, viz. with its north pole towards the north, and its south pole, consequently, towards the south. On the contrary, this power is diminished by an improper situation, and by keeping too small a piece of iron, or iron at all, appended to it.

Amongst the natural magnets, the smallest generally possess a greater attractive power in proportion to their size than those of a larger size. It frequently happens that a natural magnet, cut off from a larger loadstone, will be able to lift a greater weight of iron than the original loadstone itself. As both magnetic poles together attract a much greater weight than a single pole; and as the two poles of a magnet generally are in opposite parts of its surface, in which case it is almost impossible to adapt the same piece of iron to them both at the same time; therefore it has been commonly practised to adapt two broad pieces of soft iron to the poles of the stone, and to let them project on one side of the stone; for those pieces become themselves magnetic while thus situated, and to them the piece of iron or weight may be easily adapted. Those two pieces of iron are generally fastened upon the stone by means of a brass or silver box.

The magnet in this case is said to be armed; and the two pieces of iron are called the armature.—[*First Lines of Science.*

PENNSYLVANIA.

A peculiar and a happy feature of the Washington (Pa.) College, now in a highly flourishing condition, is its department for COMMON EDUCATION, designed to accomplish its object by qualifying teachers for common schools. To aid this most republican object, the legislature of the state has granted five hundred dollars a year, for five years, to this particular department.

Professor Gow, who has charge of this department, visited our city, and other places in New England, in behalf of the object of his charge, and from the acquaintance we formed with him at that time, we have the most entire confidence in his qualifications for this important station.

From the increasing efforts and interest every year witnessed in Pennsylvania, in behalf of *Common Education*, and the general diffusion of useful practical knowledge, there is good reason to believe, that within a few years that state will rank high among her sisters in our republic, for intelligence and virtue.

ANIMAL MECHANICS.

JOINTS.

THE human machine is not only fitted up with levers, with cords curiously constructed and applied to the levers to give them their numerous and beautiful motions, but it has also joints, or hinges, in great numbers and variety. Two kinds of joints will be seen in the shoulder and elbow; the one rolling, the other reciprocal in its motions. The elbow joint, and also the knee, simply moves back and forth without any thing of a rolling motion; as the latter motion would evidently be not only inconvenient, but would wholly defeat the object of the joints and the limbs. Equally true and evident is it, that if the joints at the shoulder and hip permitted the limbs only to move back and forth without any rolling motion, they would be but poorly fitted to answer their present numerous and important purposes.

It will be sufficiently evident from the cut, that the joint between the upper arm and the shoulder blade here represented, is curiously contrived for a rolling motion. It will be equally evident, that the elbow joint is so formed as to admit only of a reciprocal, or back and forward motion. Joints like that at the shoulder, which are somewhat common in machinery, are called ball and socket joints. Joints, like that at the elbow or knee, which are still more common in machinery than the other, are called hinges, or hinge joints.

Besides the muscles and tendons mentioned in the last Lyceum as giving motions to the bones, or levers in the human machine, the joints are furnished with another curious provision to prevent painful and dangerous friction and jars between the bones. The joints are connected and protected by curiously formed ligaments or cords, different from the tendons, and also with a soft and somewhat oily substance, which answers the double purpose of a cushion and a liquid to keep the cushion and the joint moist, and to give it a free and easy motion.

The want of room in this number prevents our enlarging upon this subject now, but we shall go more minutely into it, in the future Lyceums. In the mean time, we hope our readers will examine and study for themselves, as our great object is not to communicate knowledge, but to assist our patrons and fellow laborers in *procuring it for themselves.*

CHEMISTRY.

HEAT.

THE subject of heat is so vast as a science, and so intimately connected with the economy and comforts of life, that we could not soon exhaust it, or even present all its important and interesting features. The single principle which we have presented in two or three of the last numbers of the Lyceum, is so extensive and various in its relations and so important in its applications, that it might to great advantage occupy a volume. The principle we refer to is its *expanding bodies.* That effect upon air or water alone is great, and even incalculable and infinite in its results. The expansion of air by heat is the cause of winds in all their variety and operations. The expansion of water by the same agent, is the cause of steam, with its mighty power to give motion to the thousands of steamboats, and the millions of spindles and shuttles, carried by its force.

Air first becomes a receptacle and then a vehicle of heat. The heat produced in a furnace in the basement story of an extensive establishment, is lodged in the particles of air coming in contact with it, which by that means is made rarer and lighter, and hence moves off with the heat it has taken and deposits it in the apartments above. On a much larger and grander scale the air within the torrid zone, is furnished by the sun's rays with a liberal supply of heat, with which it immediately commences on a journey of several thousand miles, and travels with great speed from the equator to the poles, or by taking a different direction circumnavigates the earth. If we could at one view witness the operations of the whole atmosphere which surrounds the earth—if we could see it in minature, we should undoubtedly witness one of the most curious and grandest scenes in the physical world, the whole produced by this subtle and powerful agent, heat; and produced by its power to expand or enlarge the bulk of air.

Scarcely less important or great are the effects of heat upon water. On its first application to this fluid it enlarges its bulk but in a small degree, but eventually changes it into vapor, when it magnifies it to several hundred times its original dimensions. It would not be easy to enumerate or calculate the uses of heat in the simple process of evaporating water, as applied to the useful and domestic arts: but its operations in the great laboratory of nature are still more various, useful and grand. By this simple process it carries more water into the atmosphere and deposits it in clouds, then all the rivers upon the earth deposit in the ocean. In addition to its emptying the ocean of its water, as fast as it receives it from the Mississippi, the Amazon, the Danube, and all the other rivers upon the earth, it takes great quantities from the land.

Water has already been mentioned in a former number, as furnishing an exception to the common law of heat in expanding bodies. Though this liquid, like every other substance, in most of its stages, is expanded by heat, and contracted by cold, in a certain state this law seems to be reversed; and instead of being contracted, it is expanded by cold. Every child is familiar with the fact, that the bulk of water is increased in freezing, as it has been proved by too many disastrous experiments; it has broken too many pitchers and other vessels, not to have rendered its effects in that respect familiar to the dullest observer.

After all, it is not universally acknowledged that this instance is an exception to the general law. It is said that a given bulk of water is enlarged by freezing, or by becoming colder, from its taking a crystalline structure, and not from the expansion of the several and the separate particles which compose it. The same apparent exception is found in iron, bizmuth, antimony, and most or all other substances, which take a crystalline structure in going from a liquid to a solid state, which admit of the same explanation.

Clay is also mentioned as another exception to this great and general law of nature under consideration. But it ought to be remembered, that though heat contracts clay, as is shown in the burning of bricks, earthen ware, &c., it does not return to its former size by cooling, and can therefore hardly be considered an exception.

GEOLOGICAL MAP.

THE map furnished by the legislature of Massachusetts, delineating the geology of the State, is destined to do much for the cause of science and of education generally. It can evidently be made a successful and most convenient instrument to furnish a *State Collection* of *Minerals*, and what is vastly more important, it may aid every school in the Commonwealth in procuring not merely a collection of *geological specimens*, but a Cabinet of *Natural History.*

In bringing about these results it would of course lay every section of the state under a minute and rigid examination, and consequently bring to view many new resources of industry and wealth to our citizens. Such a course of measures and such results must promote the interests of every class of the community. The higher character it must give to our schools would of itself benefit the whole community, and amply, and richly repay all the trouble and expense attending it. But it would be a direct and important benefit to farmers and mechanics, by acquainting them with many valuable deposits, capable of being used for enriching land or improving the arts. Either directly or indirectly, it would confer a benefit upon persons of all other pursuits.

The most important point of all in which this subject presents itself, is in the influence it will exert, as an example to be followed by other states and smaller communities, and even individuals in our republic. Already a map with the same object is in progress for a portion of Connecticut, which will undoubtedly be extended so as to embrace the whole state. The same subject has also made some progress in Vermont and New Hampshire. Indeed from the present aspect and prospect, we may safely conclude that the time is not distant when not only every state but every school in the Union, will have its Cabinet of Natural History.

LYCEUMS.

NEW-JERSEY LYCEUM.

THE Introductory Lecture before the Trenton, N. J. Lyceum, was given a few weeks since, by Gov. Southard, and attended by the members of the legislature, in presence of the beauty and intelligence of the city. Among several subjects of interest and importance to the citizens of New Jersey, as members of a community of intellectual and moral beings, the lecturer dwelt upon the Natural History of their state, especially their Mineralogy, as worthy of their attention in particular. This subject was peculiarly appropriate for the occasion, and for the Governor of a state uncommonly rich in mineral productions.

At the organization of the Nottingham (N. J.) Lyceum, on the 9th of February, the following gentlemen were appointed officers: Aaron B. Howell, President; Gershom Mott, Vice President; Aaron A. Hutchinson, Corresponding Secretary; Wm. W. Nelson, Recording Secretary; Joshua W. Wright, Treas'r.; Geo. S. Green, Librarian.

WILTON LYCEUM.

THE citizens of Wilton, N. H. have a prosperous Lyceum, and are liberal patrons to the 'Family Lyceum.'

NORTH CAROLINA LYCEUM.

A letter from one of our subscribers in North Carolina informs us, that numerous Lyceums have been organized in that state during the present season, and that they are highly prosperous and popular.

NEW ORLEANS LYCEUM.

ABOUT a year since, the citizens of New Orleans organized a Lyceum, which has been highly prosperous. It is already furnished with apparatus, and is collecting a cabinet of minerals. If it should procure the Mexican minerals, in quantity, as it probably will, by a system of exchanges the New England Lyceums might be furnished, and in return furnish the New Orleans Lyceum with specimens from their own rich hills.

SCHOOL LIBRARIES.

WE have never heard of a library commenced in a school, which was not sustained with increasing interest. When they are once begun, the pupils never fail to secure their increase. In Dublin, N. H. a School or Juvenile Library was commenced, two or three years since, by the encouragement given by an individual to the children of the place, who have made frequent accessions to it, until it numbers nearly eight hundred volumes.

The time is not distant, when each of the 50,000 schools in the U. States will be furnished with a Library.

LYCEUM SCHOOLS.

THE proposal for establishing weekly schools throughout the country, appears to secure confidence, and excite interest in all quarters, especially at the west and north.

BOOK OF NATURE.

SHELL-FISH.

THE INSTINCTIVE SAGACITY of the crustaceous tribe also claims our attention. We have already remarked, that the little Nautilus is furnished with an apparatus for either diving or swimming. But who taught the Nautilus to sail?—and yet, without the instinctive knowledge how to make use of them, of what use would be either her sails or oars?—these, however, are not given her in vain, for she evinces a knowledge in the art of navigation, which is supposed to have been copied by some of the early mariners, and the example she affords has been held out by the poet as still deserving imitation:

'Learn of the little Nautilus to sail,
Spread the thin oar, and catch the driving gale.'

The natural sagacity of the Nautilus, in the use of his instruments of motion, is thus beautifully delineated by the descriptive pen of Hervey;—'The dexterous inhabitant (whose shell forms a natural boat,) unfurls a membrane to the wind, which serves him instead of a sail. He extends also a couple of arms, with which, as with two slender oars, he rows himself along. When he is disposed to dive, he strikes sail; and, without any apprehension of being drowned, sinks to the bottom. When the weather is calm, and he has an inclination to see the world, to take his pleasure, he mounts to the surface; and self-taught in the art of navigation, performs his voyage without either chart or compass; is himself the *vessel*, the *rigging*, and the *pilot*.'

When the sea is calm, numbers of these animals are said to be seen sailing on its surface; but at the approach of a storm, they fold in their legs, and swallowing as much water as will enable them to sink, they plunge to the bottom, where they no doubt remain in a place of security during the raging of the tempest, and when they wish to rise, they void this water, and so decreasing their specific gravity, quickly ascend to the top, where by means of their tails, answering the purpose of helms, they can steer themselves in any direction.

Sea Tortoises, without any teacher but nature, are instinctively taught to lay their eggs on the sea-shore, and cover them with sand; and no sooner are the young hatched and fitted for their journey, than they leave the place of their nativity, and run towards that element which Providence has destined for their abode; so that the poet may well say,

'Reason progressive, Instinct is complete;
Swift instinct leaps, slow reason feebly climbs.
Brutes soon their zenith reach; their little all
Flows in at once; in ages they no more
Could know, or do, or covet, or enjoy.'

When the *young Lobsters* leave the parent, they betake themselves to hiding places in the smallest cliffs in the rocks; but no sooner do they find themselves incrusted with a firm shell, than they sally out in quest of plunder. When the time of moulting, or changing the shell draws on, this animal again betakes itself to a retired situation, where it remains in security during its defenceless state; and after losing the shell, (which both crabs and lobsters do annually,) and before a new one is formed, the animal is in a very naked and defenceless state, exposed to the dog-fish, and a multitude of other depredators. In this situation they do not, however, long continue; for the new covering is formed, and completely hardened, in little more than forty-eight hours; and no sooner does it find itself covered with its new suit of armor, than it appears again on the stage, lively and active as before. The common *Crabs* herd together in distinct tribes, and keep their separate haunts. The *Soldier Crab* is not provided by Nature with a shell attached to his body, but she has inspired him with instinctive sagacity to take up his abode in the first empty one he can lay hold of, suitable for his purpose, and to change it for another when it grows incommodious. When it has overgrown or otherwise has occasion to change the shell, the little soldier is seen busily parading the shore, but still dragging its old habitation along, unwilling to part with one, until it has found another still more convenient for its purpose. It is seen stopping at one shell, turning it, then going on to another, looking at it awhile, then slipping its tail from the old habitation to try on the new. This is sometimes found to be more inconvenient, in which case it quickly returns to its old shell, and goes in quest of another more roomy and commodious. But it is not till after many trials and frequent combats, that the soldier sometimes finds himself completely equipped; for there are frequent contests betwixt two of this species, for some well-looking and commodious shell; and it is from this circumstance, perhaps, the soldier-crab derives its name. When two of them meet with the same object, each strives to take possession; they strike with their claws; they bite each other till the weakest is obliged to yield. It is then that the victor takes possession, and parades in this new conquest, backwards and forwards upon the strand, before his envious antagonist. The *Land Crabs* of the West Indies (which also may be reckoned among the *natives* of the deep,) are represented as living in a kind of orderly society, and regularly once a year marching down from the mountains to the sea, in order to deposit their spawn; and after the little creatures are hatched under the sand, *they* also are observed as regularly quitting the shore in crowds, and slowly travelling up towards the mountains.

These creatures commence their expedition in the months of April and May. At that time the whole ground is covered with this numerous band of adventurers.—The sea is the place of their destination, and to that they direct their march. No geometrician could send them by a shorter course. They never turn aside to the right or to the left, if they can possibly avoid it, whatever obstacles intervene. If they meet with a house, they will attempt to scale the walls in order to keep their ranks; and if the country be intersected by rivers, they wind along the course of the stream. They are commonly divided into three battalions, of which the first consists of the strongest and boldest males, that, like pioneers, march forward to clear the rout, and face the greatest dangers. They are often obliged to halt for want of rain. The main body is composed of females, which never leave the mountains till the rain is set in, and then descend in regular order, in columns of fifty paces broad, and three miles deep; and so close that they almost cover the ground. Three or four days after this, the rear guard follows, a straggling and undisciplined tribe, consisting of males and females; but neither so robust nor so numerous as the former. The night is their chief time of proceeding; but if it rains by day, they do not fail to profit by the occasion. When they are terrified, they march back in a disorderly manner, holding up their nippers, with which they sometimes tear off a piece of the flesh of an assailant, and leave the weapon where they inflicted the wound. They even try to intimidate their enemies, by clattering their nippers together, which, considering their number, must have a powerful effect. When they have arrived at the shore, which sometimes takes three months, they prepare to cast their spawn, by eagerly going to the edge of the water, and letting it wash several times over their bodies. At the expiration of some days spent on the land, after this washing, they again seek the shore; and shaking off the spawn into the water, leave it there. The sea, to a great distance, is black with the eggs, and shoals of hungry fish attend, and devour a considerable quantity of them; those that escape are hatched under the sand; and soon after, millions are seen quitting the shore, and making their way slowly to the mountains.

When the *Tellina* has occasion to move, she puts herself into a certain position, which occasions her to spring out with considerable force to a distance. When the *Scallop* finds herself deserted by the tide, it jerks itself forwards by opening and shutting its shell in a singular manner! When the *Razor shell-fish* finds itself deceived by the fisherman, when he decoys it from its subterraneous habitation by a sprinkling of salt, and has time to retreat, no such attempt will succeed a second time! When part of the legs of the *Sea Hedge-hog* are at work carrying him forward, the horns that are nearest in that direction are busily employed in making soundings or feeling the way. The *Muscle* when she has commenced spinning her cable, will make a trial of a thread, by drawing it out strongly towards her, before she proceeds to stretch out a second; and these cords, which she spins with so much art, are in reality as serviceable to them as cables are to a ship. There are frequently a hundred and fifty of these little columns employed in mooring a muscle; each cable is scarcely two inches long, but they are all spun by herself, and the tongue is the instrument which not only produces these numerous threads, but serves also instead of arms and legs on other occasions. The *Limpet* when she has occasion to unmoor, finds means to disengage herself without any great effort, and to move from her place by the same muscle by which she adhered so firmly to her anchorage. Even *Oysters* are said not to be destitute of the power and the instinctive sagacity to turn themselves round when thrown irregularly into a vessel of water, so that the concave shells may remain downmost, in order to retain their favorite liquor.

THE USES OF SHELL-FISH.

From the number of animals which prey upon insects, it was inferred, that the principal object the Creator had in view in the formation of these, was the subsistence of many of the larger orders of creatures; so, from the numerous herds of shell-fish, which in a great degree resemble insects, and every where abound among the beds of the ocean, and the extraordinary digestive faculties of the finny tribes, we have reason to conclude, that the former were principally intended and brought into existence for food to the latter. We will, however, mention a few particulars in which the crustaceous tribes may also be said to be otherwise serviceable.

The *Hawk's-bill Turtle* is valued on account of its shell, from whence our most beautiful snuff-boxes and other trinkets are said to be formed. The *Green Turtle*, as a wholesome and highly delicious food, has become such a valuable article in commerce, that our West India vessels are now generally fitted up with conveniences for importing them alive. The *Sand Crab* is said to be regarded as a delicacy in Jamaica: and it is even asserted that the slaves are often entirely fed upon them. Among the shell-fish on the Waterford coast, the *Murex* which gave the Tyrian purple, is said to exist. We need not mention of what estimation the *Lobster*, the *Crab*, and other shell-fish, are held among ourselves; and the delicacy of flavor which makes the *Oysters* prized as an article of food. In the Oyster also is found that beautiful substance called Mother of Pearl; but as the pearl fishery is one of the most destructive employments (the art of war excepted,) in which the human species can be engaged, it is much to be lamented, that what is principally used in the formation of trinkets should continue to be procured at the expense of so much human misery.

The pearls are searched for by *Divers*, educated to it as a profession; they descend from fifty to sixty feet, each bringing up a net full of Oysters.—The pearl is most commonly attached to the inside of the shell, but is most perfect when found in the animal itself.

The exertion undergone during this progress is so violent, that upon being brought into the boat, the Divers discharge water from their mouth, ears, and nostrils, and frequently blood; this does not, however, hinder them from going down in their turn, and the poor creatures will often make from forty to fifty plunges a day. But the violence of the exertion (by which, although the most robust and healthy are generally chosen for this employment, yet they seldom survive it five or six years,) is not the only thing the Pearl Divers have to dread; they are also exposed to the attacks of the sharks, who, if they are not successful in every attempt to extinguish at once the vital spark, and so put an end to a life so little to be envied, frequently deprive these unhappy beings of a limb, and suffer them only to escape from their jaws in a mutilated state!—Read this, ye dashing fair ones of the British isles! and think, as ye enter the ball-room under a profusion of glittering ornaments, that to procure that costly bracelet, an unhappy fellow creature was doomed to the slavery of the diamond-mines, and that beautiful pearl was procured at the peril of another's life.—And all this while so many of the transcendent beauties of creation, placed by the Almighty within our reach, pass unregarded.—But this is of a piece with the general conduct of man, who is ever apt to lose the substance in grasping at the shadow.

FISHES.

'Who can old Ocean's pathless bed explore,
And count her tribes that people every shore?'
'From icy oceans, where the whales
Toss in foam their lashing tails.'

If the Ostrich, the Emu, and the Cassowary, were remarkable for their size, and claimed our first attention among the feathery tribes, in consequence of their apparently constituting part of that link which unites the quadruped to the volatile race, the *Whale* deserves our immediate notice on entering among the finny tribes; not only on account of its enormous bulk, which has occasioned it in its movements to be compared to a mountain in motion, but for the resemblance that it bears to the four-footed class of animals in its internal structure, and that superior instinctive sagacity which it displays in its conjugal attachment, and care of its offspring. In bulk, the Whale may be said to exceed every animal of which we have any certain description.—They are in the Arctic regions at present from sixty to ninety feet long; but formerly, when the captures were less frequent, and they were not so much thinned before arriving at a larger growth, they were said to be found of the enormous length of 250 feet; and in the Indian Seas they are still seen 150 feet in length. Yet notwithstanding its amazing bulk, this creature must not be considered as a huge unwieldy mass; for according to La Cepede, it swims at the rate of thirty-three feet in a second, and it is computed that it might circumnavigate the globe, in the direction of the equator, in forty-seven days, even allowing it to rest by night during that time! It is believed to be extremely long-lived; and the method of catching these huge animals is said to be one of the boldest enterprises of man. As the whale fishing has, however, been so fully described in a variety of publications, within the reach of the greater part of our readers, we shall pass it over for the present. But large as the whale is, what is its size in comparison with the *Kraken*? if such an animal exists; which is said to be 'a mile and a half in circumference;—that when it appears above the water, it resembles a parcel of small islands and sand banks, on which fish disport themselves, and sea-weeds grow;'—and that 'when he sinks, which he does gradually, a dangerous swell succeeds, and a kind of whirlpool is actually formed in the water.'

Far from being disposed to set bounds to the power of the Almighty, by denying the *possibility* of the existence of such an animal, we would conclude in the words of Goldsmith, that 'to believe all that has been said of those animals would be too credulous, and to reject the possibility of their existence, would be a presumption unbecoming mankind.'

In the internal conformation of its parts, and in a few of the external ones, of the Whale, there is such a similarity to those of quadrupeds, that Linnæus has placed it in the same class; to which its claim, and that of the other cetaceous fishes, seem, indeed, little inferior to that of the Seal, where the last gradation in that order of animals may be said to end.

In its instinctive tenderness the Whale, is indeed entitled to our admiration: but as we shall have occasion to speak more fully on that subject by and by, we will defer the consideration of it to our next.

ILLINOIS GAZETTEER.

REV. J. M. Peck, of Rock Spring, Illinois, whose labors have not only benefitted his own state, but the whole community, and the whole cause of education, has issued a prospectus for a Gazetteer in Illinois. That object is certainly a good one; and from the extensive and intimate knowledge he has given of his subject in some works of a kindred nature already published, and from his good judgment and well tempered enthusiasm in every good cause, we cannot doubt but the plan will be as well carried out, as it is good in its design.

QUESTIONS ON LYCEUM No. 27.

WAS Josephine gentle or passionate under the violence of Napoleon?

When did she become empress of France?

Was she ambitious of arriving to that elevation, or did she attempt to check her husband in his ambition?

How did she treat her companions in prison, after her elevation?

Was Napoleon uniform in his treatment to the empress, or was he capricious and passionate?

When did the coronation of the empress take place, and what was its character?

How did the emperor and empress spend their time immediately after her coronation?

When did their separation take place?

How did he treat her after their separation?

Did the mutual affection between them continue after their separation, or was it destroyed?

When, and with what disease did Josephine die?

When did Columbus leave Spain on his first voyage of discovery?

What circumstance caused uneasiness on his own mind, and complaints among the sailors?

What is the common size of the ourang outang, and where is he found?

Does any animal more resemble a human being than the ourang outang?

What is the prominent feature of the House of Reformation in South Boston?

How are the proposals and the plan of the School Agent Society received by the friends of Education at the West, favorably or unfavorably.

What three departments are contemplated in the agency of this society?

What other institutions are designed to co-operate with this society in effecting its objects?

How can Town and County Lyceums forward the designs of the School Agent Society?

What branches of knowledge are necessary to be fully acquainted with ourselves?

Why is it necessary that we should understand Natural Philosophy for the purpose of self-knowledge?

Which department of our nature is most important to understand, physical, intellectual, or moral?

What radical defect generally prevails in our literary institutions?

What is necessary to promote moral culture in schools?

What is the most curious and most useful instrument which has ever been constructed?

How many bones are there in the human hand? and how many in the wrist, also in the arm?

What is the bone between the shoulder and the elbow called?

How many between the elbow and hand, what their names?

What is that bone called between the elbow and thumb?

How are the bones of the arm and hand, and of our systems, generally put in motion?

What are the extremities of the muscles, or the parts connecting them with the bones, called?

How high heat can be produced by blows upon a rod of iron, while lying across the edge of an anvil?

How can the heat produced in a fire syringe be explained?

If snow and salt be mixed, do they produce cold or heat?

Does sulphuric acid poured upon ice produce heat or cold? if the acid is mixed with water what is the result? and how are the opposite results explained?

What is the success of the Lancaster Lyceum in their meetings of teachers with their pupils?

What are the effects of Lyceums in Ohio and Indiana?

What are some of the vegetables produced in the sea?

What are some of the most common shell-fish?

What state is provided with a geological Map, under the direction of the Legislature?

To whom is the knowledge contained in this map principally confined?

What can be done to render this map ten fold more useful, by making it an instrument to give the community generally a knowledge of our Geology?

How much would it cost to furnish every school in the state with a copy of this map?